

CLAIMS

What I claim is:

1. An isolated and purified nucleic acid molecule encoding a high molecular weight protein (HMW) HMW3 or HMW4 of a non-typeable *Haemophilus* strain or a variant or fragment of said protein retaining the immunological ability to protect against disease caused by a non-typeable *Haemophilus* strain, having:

- (a) the DNA sequence shown in Figure 8 (SEQ ID No: 7) and encoding protein HMW3 having the derived amino acid sequence of Figure 10 (SEQ ID No: 9), or
- (b) the DNA sequence shown in Figure 9 (SEQ ID No: 8) and encoding protein HMW4 having the derived amino acid sequence of Figure 10 (SEQ ID No: 10).

2. An isolated and purified nucleic acid molecule encoding a high molecular weight protein (HMW) of a non-typeable *Haemophilus* strain, which is selected from the group consisting of:

- (a) a DNA sequence as shown in any one of Figures 8 and 9 (SEQ ID Nos: 7 and 8);
- (b) a DNA sequence encoding an amino acid sequence as shown in Figure 10 (SEQ ID Nos: 9 and 10); or
- (c) a DNA sequence encoding a high molecular weight protein of a non-typeable *Haemophilus* strain which hybridizes under stringent conditions to any one of the DNA sequences of (a) and (b).

3. The nucleic acid molecule of claim 2 wherein the DNA sequence (c) have at least about a 90% identity of sequence to the DNA sequences (a) or (b).

4. A vector for transformation of a host comprising the nucleic acid molecule of claim 2.

5. An isolated and purified high molecular weight (HMW) protein of non-typeable *Haemophilus* or any variant or fragment thereof retaining the immunological ability to protect against disease caused by a non-typeable *Haemophilus* strain, which is characterized by at least

- one surface-exposed B-cell epitope which is recognized by monoclonal antibody AD6.
6. The protein of claim 5 which is HMW1 encoded by the DNA sequence shown in Figure 1 (SEQ ID No: 1), having the derived amino acid sequence of Figure 2 (SEQ ID No: 2) and having an apparent molecular weight of 125 kDa.
 7. The protein claim 5 which is HMW2 encoded by the DNA sequence shown in Figure 3 (SEQ ID No: 3) and having the derived amino acid sequence of Figure 4 (SEQ ID No: 4) and having an apparent molecular weight of 120 kDa.
 8. The protein claimed in claim 5 which is HMW3 encoded by the DNA sequence shown in Figure 8 (SEQ ID No: 7) and having the derived amino acid sequence of Figure 10 (SEQ ID No: 9) and having an apparent molecular weight of 125 kDa.
 9. The protein claimed in claim 5 which is HMW4 encoded by the DNA sequence shown in Figure 9 (SEQ ID No: 8) and having the derived amino acid sequence shown in Figure 10 (SEQ ID No: 10) and having an apparent molecular weight of 123 kDa.
 10. A conjugate comprising a protein as claimed in claim 5 linked to an antigen, hapten or polysaccharide for eliciting an immune response to said antigen, hapten or polysaccharide.
 11. The conjugate as claimed in claim 10 wherein said polysaccharide is a protective polysaccharide against *Haemophilus influenzae* type b.
 12. A synthetic peptide having an amino acid sequence containing at least six amino acids and no more than 150 amino acids and corresponding to at least one protective epitope of a high molecular weight protein HMW1, HMW2, HMW3 or HMW4 of non-typeable *Haemophilus influenzae*, wherein the epitope is recognized by at least one of monoclonal antibodies AD6 and 10C5.
 13. The peptide as claimed in claim 12 wherein the epitope is located within 75 amino acids of the carboxy terminus of the HMW1 or HMW2 protein.